

DESCRIPTION OF NEW WEST AUSTRALIAN MITRIDAE AND VEXILLIDAE (MOLLUSCA: GASTROPODA)

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Abstract. Two new species of Vexillidae and one new species and a subspecies of Mitridae from Western Australia are described as new to science.

Family MITRIDAE Swainson, 1831

Subfamily IMBRICARIINAE Troschel, 1867

Genus **Scabricola** Swainson, 1840

Scabricola Swainson, 1840, Treat. Malacology, pp. 130, 131, 319. Type species by SD (Gray, 1847) *Mitra serpentina* Lamarck, 1811 = *Voluta variegata* Gmelin, 1791. Recent, Indo-Pacific.

Subgenus **Scabricola** Swainson, 1840

Scabricola (Scabricola) backae, sp. n.

(Figs. 1-5)

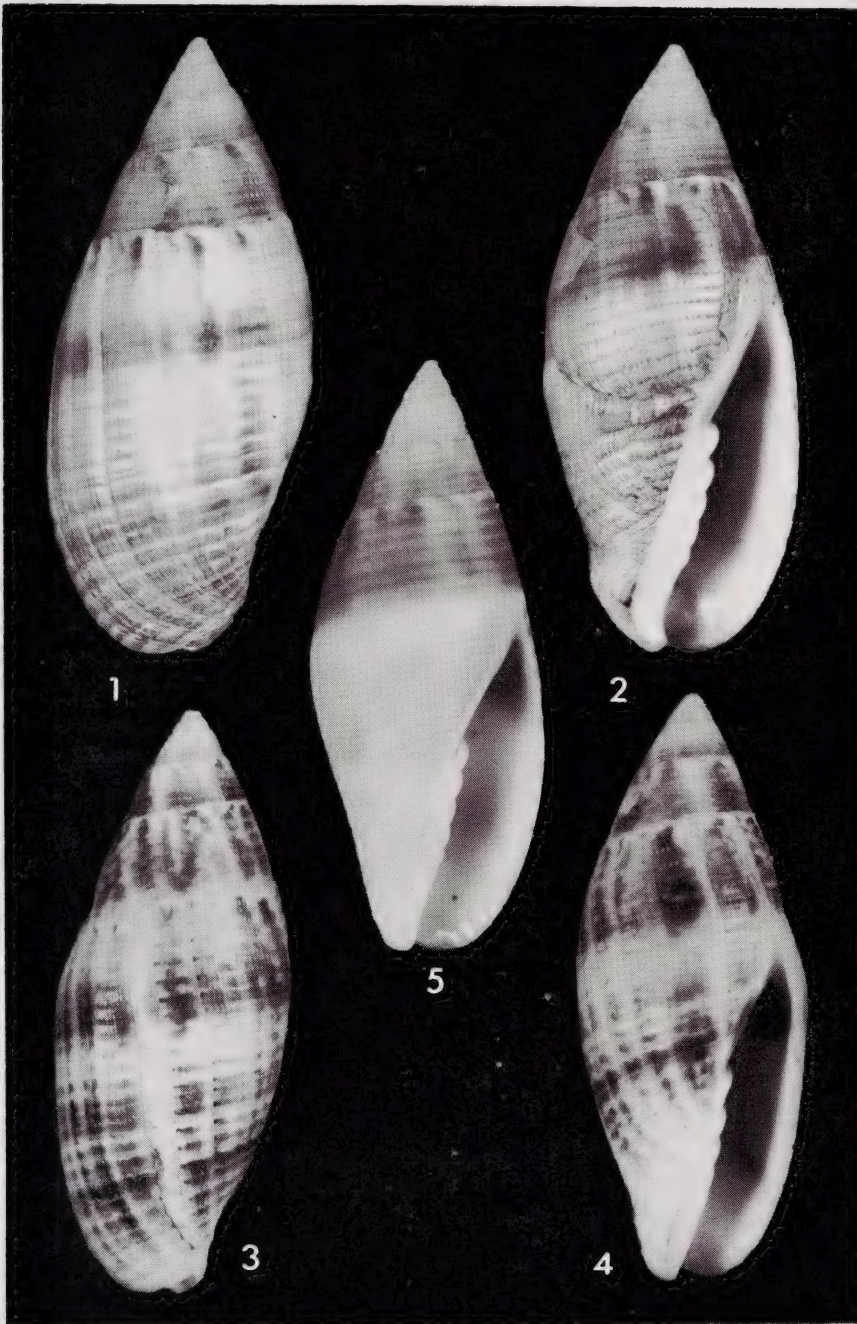
Shell moderately small, 20.0-26.0mm in length, elongate-ovate, moderately solid. White to greyish-white in colour, ornamented with nebulous brown streaks on spire whorls and 2-3 narrow or moderately broad brown bands on body whorl; the brown bands occasionally broken up into axial streaks, the sutures having irregularly spaced and more saturated small brown spots. Teleoconch of $4\frac{3}{4}$ - $5\frac{1}{2}$ whorls, first two post-nuclear whorls convex, later whorls almost flat-sided, partly preserved protoconch consisting of $1\frac{1}{2}$ + smooth, white nuclear whorls. First post-nuclear whorl sculptured with 5-7 minutely pitted spiral grooves, penultimate whorl with 6-8 grooves and body whorl with 14-20 grooves, apart from up to a dozen oblique cords towards base of body whorl; the spiral grooves bisected by numerous, close-set axial lirae rendering the grooves pitted. Spiral grooves either broad or narrow giving rise to broad or narrow, angulate spiral threads which appear stepped in profile; sutures narrowly incised and irregularly crenate by the intruding axial lirae. Aperture longer than spire, narrow, smooth and porcellaneous-white within; outer lip regularly convex and minutely but bluntly crenulate on the moderately thickened margin. Columella calloused, white, and with 5 strong, oblique folds which decrease in size anteriorly; in some adult specimens anterior end of columellar callus terminating in a small point recurving towards aperture. Siphonal canal short, siphonal notch distinct, siphonal fasciole corded and calloused in adult individuals.

TYPE LOCALITY. Flinders Bay, Augusta, southwest Australia, intertidal.

KNOWN RANGE. From Onslow to Flinders Bay, Augusta.

Holotype. In the Western Australian Museum, Perth, No. 14-72; length 22.6mm, width 9.5mm, height of aperture 14.8mm, *leg.* F. Back, January 1972 (Figs. 1, 2).

Paratypes. Flinders Bay, Augusta: No. 233-70a-b, $26.2 \times 9.8 \times 15.7$ mm and $24.2 \times 9.7 \times 15.4$ mm; No. 14-72a, $20.0 \times 8.0 \times 12.9$ mm (Fig. 5) (all specimens in WAM); $23.1 \times 9.0 \times 15.2$ mm and $22.8 \times 9.4 \times 15.0$ mm in H. Eker coll.; $22.0 \times 9.0 \times 14.6$ mm in author's coll. S. end of Garden I: No. 472-72, $21.2 \times 8.0 \times 12.7$ mm in WAM. Onslow: $25.0 \times 10.0 \times 16.0$ mm in M. Marrow coll. (Figs. 3, 4); $22.1 \times 19.3 \times 14.6$ mm in F. Hadrill coll.



Figs. 1-5. *Scabricola (Scabricola) backae* sp. n. 1, 2. Holotype WAM No. 14-72; Flinders Bay, Augusta, S.W. Australia; length 22.6mm (broad form). 3, 4. Paratype from Onslow, West Australia; coll. M. Marrow; length 25.0mm (slender form). 5. Paratype WAM No. 14-72a; Flinders Bay, Augusta, S.W. Australia; length 20.0mm (juvenile specimen).

Scabricola backae is the only species in the genus which extends from tropical waters to warm temperate waters (c. 16°C) of the southwest Australian tropic-temperate faunal transition zone. The species can be compared with *Scabricola desetangii* (Kiener, 1838) from the tropical Indo-Pacific but it lacks this species prominent spiral cords, gemmate spire-whorl sculpture, shorter spire and narrower aperture. *S. backae* is perhaps nearest to *Mitra hayashii* Kira, 1959, from Japan, but this species is more slender and pterygine in form, the spire is shorter, the aperture more narrow and fusiform and the sculpture is finer with more numerous and close-set spiral grooves. *Scabricola barrywilsoni* (J. Cate, 1968), which ranges from Onslow, West Australia, to Darwin, Northern Territory, differs in form, formation of whorls, sculpture and colour-pattern, and is here illustrated for comparison (Figs. 6, 7).

The species is named for Mrs Fay Back who first collected this species at Augusta.

Subgenus **Swainsonia** H. & A. Adams, 1853

Swainsonia H. & A. Adams, 1853, Gen. Rec. Mollusca, 1: 180. Type species (art. 67i of ICZN) *Mitra fissurata* Lamarck, 1811. Recent, Indo-Pacific.

Scabricola (Swainsonia) ocellata ekeræ subsp. n. (Figs. 8 - 12)

Shell moderate in size, 27.0-38.0mm in length, fusiformly-elongate or occasionally elongate-cylindrical, solid. Fawn to light grey in colour, body whorl from periphery to base green or brownish-green; columella and folds greyish, edge of outer lip and tip of siphonal canal orange-brown or purple-brown, interior of aperture greenish. Whorls 7-9, convex at the shoulder, protoconch with 1½-2 conical, glassy-brown nuclear whorls. First 3-4 post-nuclear whorls with 3 spiral rows of small punctures, penultimate whorl and sutural area of body whorl with 5-8 wide-spaced, finely incised and minutely punctate spiral grooves. Axial sculpture consisting of close-set, numerous and slender axial riblets continuing to presutural area of body whorl and ceasing abruptly at periphery. Aperture narrow, longer than spire, smooth within, outer lip descending almost vertically and forming a rounded point basally; columella glazed or prominently calloused, the 5-6 columellar folds prominent, close-set, parallel and set very low on the columella almost reaching the tip of the siphonal canal and extending partly over the siphonal fasciole. Siphonal canal short, straight and pointed, siphonal notch deep.

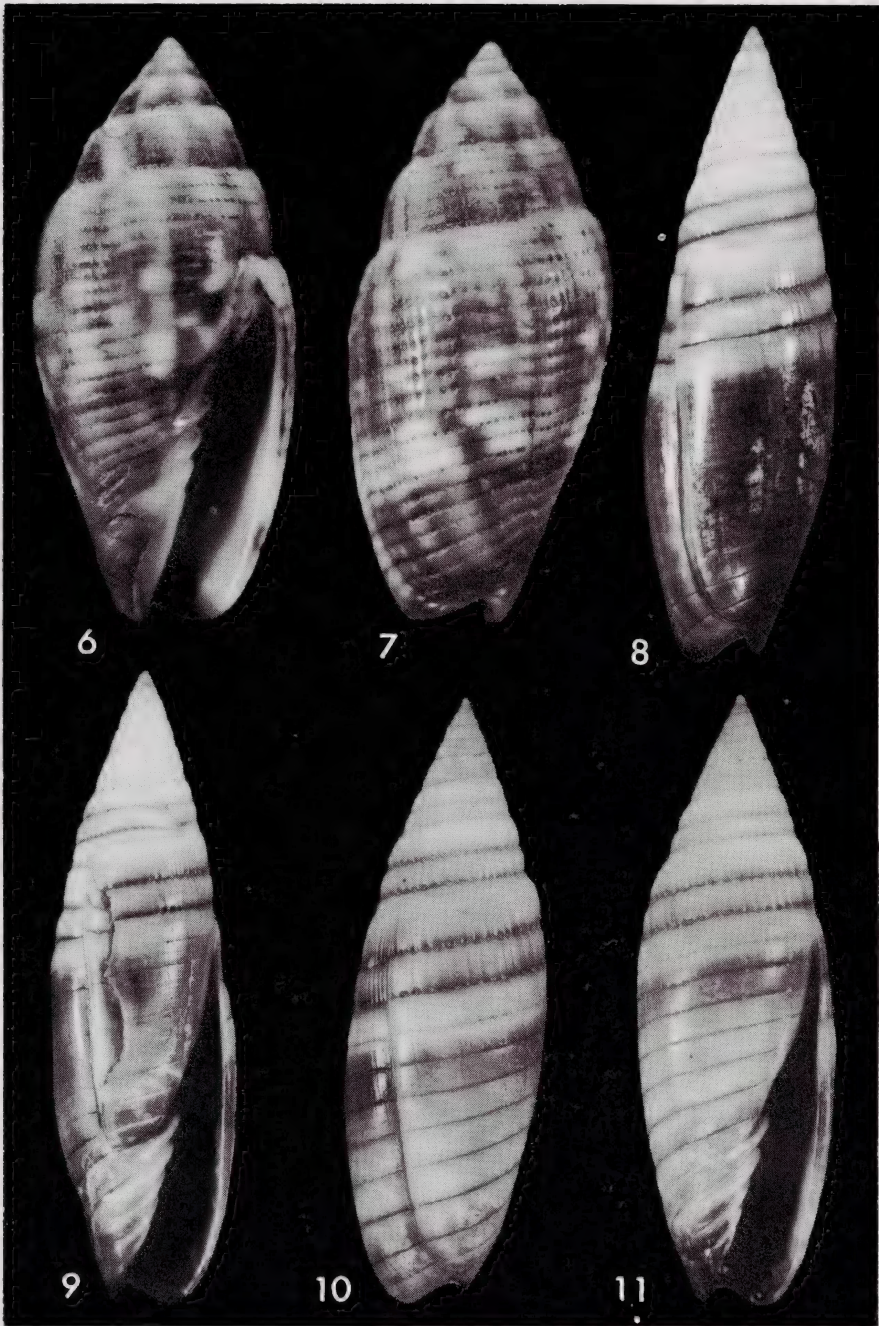
Radular ribbon 4.2mm in length, typically *Scabricola* type, formula 1 + 1 + 1, with 59 transverse rows of teeth (+ 2 nascentes). Rachidians narrowly triangular, with 8 slender and deeply rooted cusps which decrease in size towards the base. Lateral teeth slightly larger than rachidians, equipped with 5 inward facing cusps on an angular plate, last half of lateral white and thin (Fig. 12).

TYPE LOCALITY. Southwest of Point Cloates, West Australia, Lat. 113°39'30" E, Long. 22°43'30" S.

KNOWN RANGE. From Point Cloates to the Dampier Archipelago.

HABITAT. On sand and algae covered bottom, from the intertidal zone to a depth of 23 fathoms (42m).

Holotype. In the Western Australian Museum, Perth, No. 5014-68; length 37.0mm, width 11.0mm, height of aperture 22.4mm, Ningaloo Expedition, 7. 9. 1968 (Figs. 8, 9). *Paratypes*. Point Cloates: 37.4 × 11.4 × 21.7mm; 35.9 × 10.7 × 21.7mm; 33.8 × 10.2 × 20.8mm; 30.6 × 9.8 × 19.4mm; 29.8 × 9.8 × 19.4mm (Figs. 10, 11) (all spec. in



Figs. 6-11. 6, 7. *Scabricola (Scabricola) barrywilsoni* (J. Cate, 1968); N. of Port Hedland, West Australia; length 23.8mm. 8-11. *Scabricola (Swainsonia) ocellata ekeræ* subsp. n. S.W. of Point Cloates, West Australia. 8, 9. Holotype WAM No. 5014-68; length 37.0mm. 10, 11. Paratype WAM No. 5014-68a; length 29.8mm.

WAM); 33.0 × 10.0 × 20.8mm (in author's coll.). N. Muiron I: 34.0 × 10.8 × 23.0mm; 27.5 × 9.1 × 16.8mm (in M. Marrow coll.). W. of Flat I, near Onslow: (specimens in WAM). 20 miles (32km) N. of Delambre I, Dampier Archipelago, 23 fathoms (42m) (specimens in WAM).

Scabricola (Swainsonia) ocellata ekeræ is a geographically segregated subspecies which is morphologically separable from the nominate species *S. (S.) ocellata ocellata* (Swainson, 1831). *S. (S.) ocellata* and its two small forms *Mitra incisa* Adams & Reeve, 1850, and *M. mariae* A. Adams, 1853, always have 3-4 angulate spiral cords on the penultimate whorl and the presutural area of the body whorl, and not two constricted grooves. *S. (S.) ocellata ekeræ* lacks the white hair-line pattern and 2 rows of small brown and white spots bordering the dark greenish band on the body whorl. In *S. (S.) ocellata ocellata* the axial sculpture consists of short axial lirae which are confined to the interstices of the angulate cords, whereas in the subspecies *ekeræ* the axial riblets are slender, close-set and continuous.

The species is named for Miss Helene Eker, a keen student of the family Mitridae.

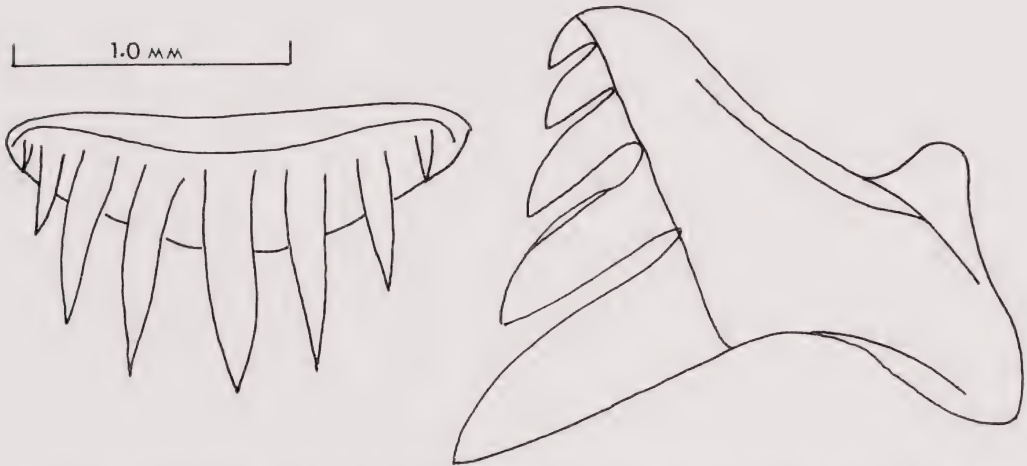


Fig. 12. Half-row of radula of *Scabricola (Swainsonia) ocellata ekeræ* subsp. n. S.W. of Point Cloates, West Australia, ♂.

Family VEXILLIDAE Thiele, 1929

Ponder (1972) published the results of anatomical studies of species of Mitridae and Vexillidae and the findings necessitate an elevation of the mitrid Vexillinae to family rank. Ponder found pronounced differences in the structure of the pedal gland, renal organ, accessory salivary glands, gland of Leiblein and the gonads, which lend support to a familial separation of the two groups. Although Ponder stated that an epiproboscis (formerly "venom-gland") is absent in the Vexillidae, this organ has been observed in the vexillid genus *Thala* H. & A. Adams, during an experiment arranged by Mrs V. Orr Maes at the Academy of Natural Sciences, Philadelphia.

Genus **Vexillum** Röding, 1798Subgenus **Pusia** Swainson, 1840

Pusia Swainson, 1840, Treat. Malacology, p. 320. Type species by M. P. *microzonis* (Lamarck) = *Mitra microzonias* Lamarck, 1811. Recent, Indo-Pacific.

Vexillum (Pusia) hansenae sp. n.

(Figs. 13-16)

Shell small, 6.0-21.0mm in length, variable in form, ovate to fusiformly-elongate, solid. Base colour bluish-white to steel-grey, spire whorls ornamented at sutures with a turret-like, dark olive-green narrow band which appears as small quadrate spots at the sutures; lower two-thirds of body whorl dark olive-green, interrupted in places by narrow, interrupted bluish-white bands of the protruding base colour. At periphery, the dark olive-green zone with a turret-like border; aperture greenish-brown and occasionally cream-banded, columellar folds white or grey, parietal wall dark olive-green. Teleoconch of 4-6 convex whorls, protoconch of 1-1½ smooth and slightly globose nuclear whorls; sculptured with broad, irregular, ill-developed flattish axial folds numbering 12-21 on penultimate whorl and 2-15 on body whorl. Spiral sculpture not visible to the naked eye, base of body whorl with 6-14 oblique spiral cords; sutures narrowly incised. Aperture narrow, equal in height or slightly longer than spire, lirate within, lirae occasionally obsolete, outer lip moderately thickened, simple and regularly convex; columella only thinly glazed and with 4 prominent, oblique folds decreasing in size towards the anterior. Siphonal canal short and straight, siphonal notch moderately shallow.

TYPE LOCALITY. Sarge Bay, Augusta, southwest Australia, intertidal.

KNOWN RANGE. From Busselton to Cape Riche, southwest Australia.

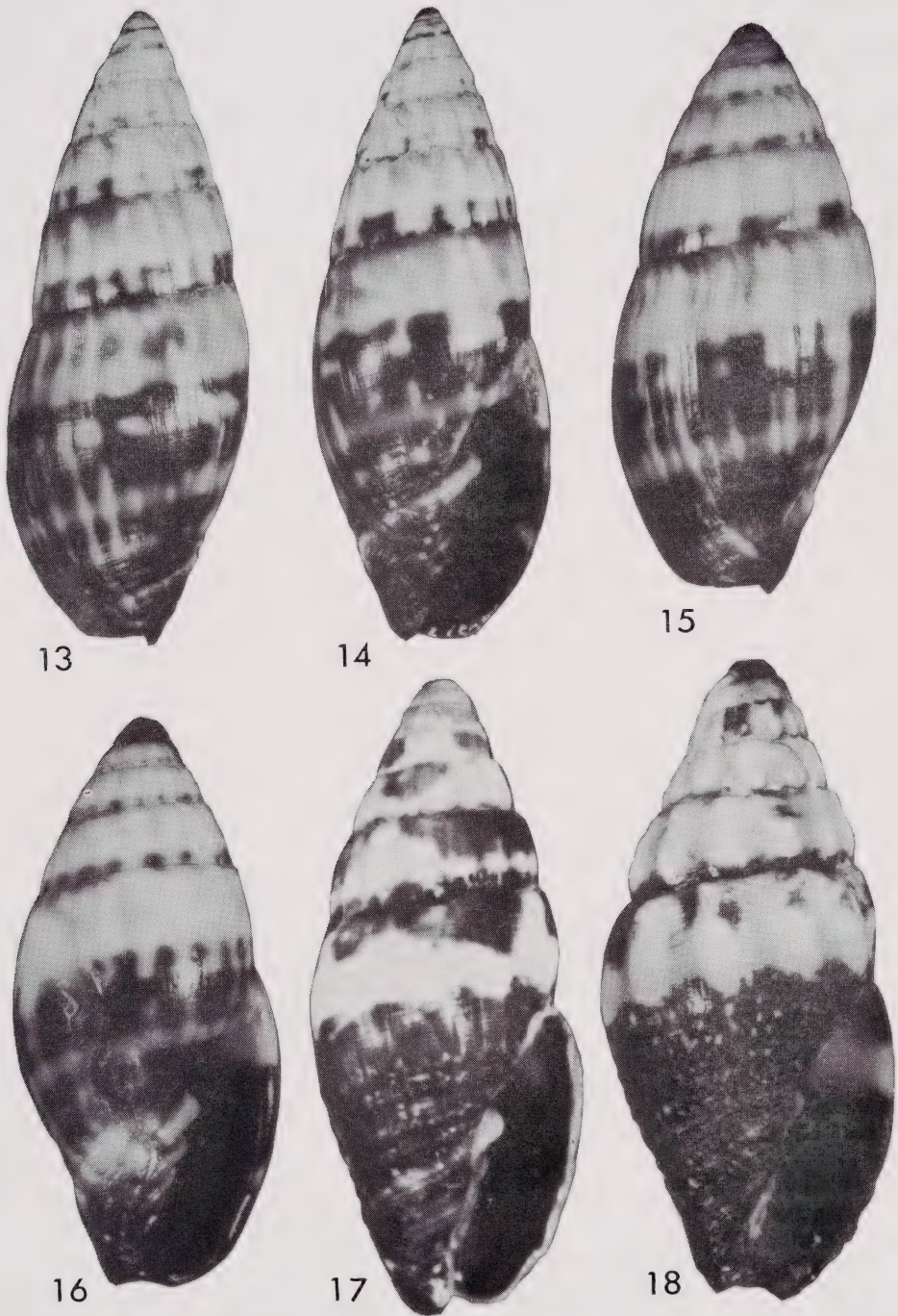
HABITAT. On reefs, in rock-pools and under rocks, intertidal.

Holotype. In the Western Australian Museum No. 13-72; length 14.6mm, width 5.5mm, height of aperture 7.2mm, *leg.* G. Hansen, 26.5.1971 (Figs. 13, 14).

Paratypes. Total of 27 specimens examined. Paratypes are in the Western Australian Museum, coll. M. Marrow, coll. G. Hansen, coll. F. Haddrill, coll. H. Eker and the author's coll. 2 miles (3.2km) N.W. of Busselton: 11.5 × 4.5 × 6.2mm (WAM); Margaret River: 8.9 × 4.1 × 5.4mm (2 spec. in M. Marrow coll.); Sarge Bay, Augusta: 20.5 × 7.2 × 9.5mm; 9.5 × 4.2 × 5.6mm (Figs. 15, 16) (6 spec. in WAM, 3 spec. coll. H. Eker and 2 spec. in coll. G. Hansen); Two Peoples Bay: 13.5 × 5.1 × 6.9mm (1 spec. coll. M. Marrow and 1 spec. coll. F. Haddrill); Cape Riche: 10.8 × 4.7 × 5.9mm (10 spec. in coll. M. Marrow and 1 spec. in author's coll.).

The species superficially resembles *Vexillum (Pusia) microzonias* (Lamarck, 1811) which also occurs in Western Australia, but this species has more distinctly incised sutures, axial ribs instead of flat folds, prominent spiral striae, a wider aperture, different colour pattern and has the lower half of the body whorl sculptured with prominently nodulose cords (Figs. 17, 18).

The species is named for Mrs G. Hansen, who collected the species at Augusta.



Figs. 13-18. 13-16. *Vexillum (Pusia) hansenae* sp. n. Sarge Bay, Augusta, S.W. Australia. 13, 14. Holotype WAM No. 13-72; length 14.6mm (slender form). 15, 16. Paratype WAM No. 13-72a; length 9.5mm (broad form). 17, 18. *V. (P.) microzonias* (Lamarck, 1811). 17. Port Hedland, West Australia; WAM No. 153-70; length 16.2mm. 18. Sculptural variant, Airport beach, Barrow I, West Australia; WAM No. 2515-67; length 14.0mm.

Vexillum (Pusia) marrowi sp. n.

(Figs. 19-23)

1966. *Proximitra pica* (Reeve), Hodgkin, Kendrick, Marsh and Slack-Smith, West. Australian Nat. Club Handb., no. 9: 47, pl. 18, fig. 4 (*non Mitra pica* Deshayes & Edwards, 1844; *nec* Reeve, 1845).

Shell small, 7.0-21.0mm in length, generally ovate or occasionally elongate-ovate, solid. Brown to purplish-brown in colour, ornamented with an irregular white presutural transverse band and small or large white flecks; aperture brown near edge of outer lip and violet or purplish within, parietal wall brown, columellar folds bluish-white or violet. Teleoconch of 4-6 short, convex whorls, protoconch of $1\frac{1}{2}$ - $2\frac{1}{2}$ smooth nuclear whorls; sutures sharply incised and distinct. Sculptured with slender and occasionally angulate axial ribs numbering 15-28 on penultimate and 1-20 on body whorl; slender and often flattened and irregular spiral striae encircle whorls, numbering 5-14 on penultimate and 8-17 on body whorl, apart from 7-13 oblique basal cords. Interstices of spiral cords minutely punctate giving the impression of being finely striate. Aperture longer than spire, moderately wide and lirate within, outer lip convex and constricted anteriorly; parietal wall glazed, lower half of columella calloused and with 4 distinct, oblique folds. Siphonal canal straight and short, siphonal notch distinct but moderately shallow.

TYPE LOCALITY. Yanchep reef, c. 30 miles (c. 48km) north of Perth, West Australia.

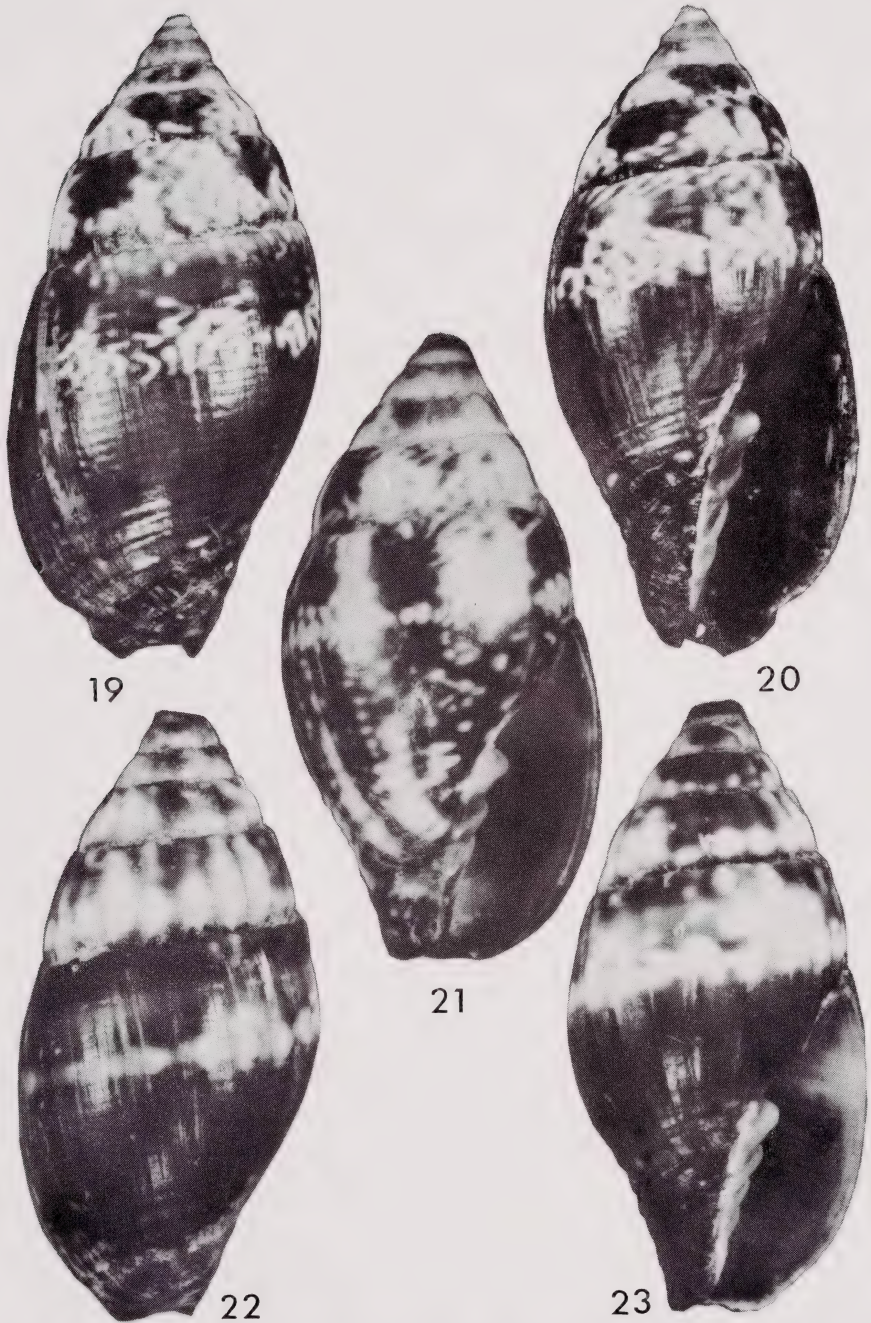
KNOWN RANGE. From Port Gregory to Margaret River, S. of Cape Naturaliste, southwest Australia.

HABITAT. Under rocks and in rock-pools, from the intertidal zone to a depth of 13 fathoms (24m).

Holotype. In the Western Australian Museum No. 408; length 12.9mm, width 6.2mm, height of aperture 7.8mm (Figs. 19, 20).

Paratypes. 89 specimens examined. Paratypes are in the Western Australian Museum, coll. M. Marrow, coll. H. Eker, coll. T. Whitehead and the author's collection. Port Gregory: $21.2 \times 9.6 \times 11.7$ mm (2 spec. in WAM); East Wallaby I, Houtman Abrolhos Archipelago: (1 spec. in WAM); Zeewyck Channel, Houtman Abrolhos Archipelago: $16.9 \times 7.4 \times 9.0$ mm (1 spec. in WAM); Horrocks Beach: (1 spec. in M. Marrow coll.); Port Dennison reef, 15 miles (24km) S.W. of Dongara: (1 spec. in WAM); Yanchep reef: (2 spec. in WAM); Sorrento Beach, N. of Perth: (6 spec. in M. Marrow coll.); North Beach, Perth: $11.5 \times 5.8 \times 6.9$ mm (Fig. 21) (8 spec. in WAM; 1 spec. in author's coll.); South Cottesloe Beach, Perth: (1 spec. in author's coll.); Woodman's Point, Coburn Sound: (3 spec. in WAM); Lady Adeline Bay, Rottnest I: $6.9 \times 4.2 \times 4.6$ mm (48 spec. in WAM; 4 spec. in M. Marrow coll.; 1 spec. in author's coll.); Shoalwater Bay, via Rockingham: (1 spec. in WAM); 2 miles (3.2km) N.W. of Busselton jetty, 12-13 fathoms (22-24m): $11.4 \times 5.5 \times 6.8$ mm (Figs. 22, 23) (2 spec. in WAM); Bunker Bay: (1 spec. in WAM); Margaret River: (4 spec. in H. Eker coll.).

This common intertidal species has been confused with *Mitra pica* Reeve, 1845 (*non* Deshayes & Edwards, 1844), which is *Waimatea obscura* (Hutton, 1873), an operculate species belonging to the family Volutomitridae. It has also been occasionally labelled *Mitra alveolus* Reeve, 1845, which is an indeterminate species whose type has been sold at auction. *Vexillum (Pusia) marrowi* is superficially similar to *V. (P.) hansena*, but is broader and more ovate and has narrow, angulate axial ribs instead of flat folds and a spiral sculpture with pitted interstices, a feature lacking in *V. (P.) hansena*.



Figs. 19-23. *Vexillum (Pusia) marrowi* sp. n. 19, 20. Holotype WAM No. 408; Yanchep reef, West Australia; length 12.9mm. 21. Paratype WAM No. 151-70; North Beach, Perth; length 11.5mm. 22, 23. Paratype WAM No. N-3569; 2 miles (3.2km) N.W. of Busselton jetty, 12-13 fathoms (22-24m); length 11.4mm (axially ribbed on body whorl).

The species is also similar to *V. (P.) microzonias* (Lamarck, 1811) and its sculptural forms (Figs. 17, 18), but this species is more elongate-ovate, the body whorl is considerably shorter, the spiral sculpture more prominent, and the lower half of the body whorl has distinctly granulose spiral cords.

The species is named for Mr M. Marrow, who collected the species at various West Australian localities.

Acknowledgements. I would like to thank Dr B. Wilson, Western Australian Museum, Perth, Mrs F. Back, Miss H. Eker, Mrs G. Hansen and Mr M. Marrow for the loan of specimens of the newly described molluscs.

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